Clinton
Hub City of Western Oklahoma

Agenda Commentary

Item Title/ Subject: Water Treatment Plant Engineering Report

Staff Source: City Manager, Steve Hewitt

Date: July 1, 2013

Background/Subject Information:

PEC presented a quick over-view of what it will cost and take to build a new Water Treatment Facility near Clinton. PEC will walk you through this complex plan and effort. Current price estimates for this plant cannot be completed until DEQ sees an Engineering Report and determines our process. This report is very complex and detailed. (see contract) After DEQ reviews and determines / approves our process, we will then have an accurate number for costs and time.

Recommendation:

Work session is scheduled prior to our Regular meeting. If Council feels ready, determined, and comfortable moving forward with a treatment plant project; then approve the contract provided by PEC and finalize final exact pricing.

However, I caution you to move too quickly. The information you receive in the work session could be cumbersome and complex. Canute and Foss projects may be a factor to how quickly you need a plant. Cost for water is expensive. Council may need to get more community input prior to the Engineering investment.

Price/Cost: $160,000

June 25, 2013

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

City of Clinton
415 Gary Blvd
Clinton, OK 73601

Attention: Mr. Steve Hewitt, City Manager

Reference: Water Treatment Plant Engineering Report

Dear Mr. Hewitt:

This letter is written to serve as an agreement between the City of Clinton, Oklahoma, (CLIENT) and Professional Engineering Consultants, P.A. (PEC) to perform professional services to develop an Engineering Report for the design of a water treatment plant to treat raw water from the Washita River alluvium, hereinafter called the PROJECT.

Specifically, PEC proposes to perform the Scope of Services as outlined in Paragraph A below.

A. Scope of Services:
Attend two (2) onsite meeting with the Oklahoma Department of Environmental Quality (ODEQ) to discuss the proposed project, including raw water supply, piloting, treatment processes, and waste handling methods. Attend one (1) workshop and Council meeting with the City of Clinton.

Groundwater Supply
Oversee the drilling of an exploratory borehole to a total depth of 125 feet to ensure full penetration into the underlying Permian red beds to:

- Evaluate well yield
- Collect data for well design
- Evaluate aquifer and well hydraulic parameters
- Determine appropriate well spacing requirements
- Assess groundwater quality

PEC further recommends that the exploratory boring be converted into a temporary well to allow test pumping and collection of well and aquifer hydraulic data. This data will be used for development of appropriate well design to optimize productivity and well efficiency, as well as determine the radius of the cone of depression for establishment of appropriate well spacing requirements.

To aid in characterization of subsurface lithology, PEC recommends that drill cuttings from the borehole be collected at 5-foot intervals and placed into cloth sample bags. Each sample should be washed and screened using clean, clear water before being placed into the sample bag. Sample bags should be clearly marked with the owner's name, date, and

the depth from which the sample was collected.

The PEC Hydrogeologist will be on site to supervise all drilling and testing operations, inspect formation samples, supervise collection and interpretation of petrophysical logs, as well as mange collection of ground water samples and test pumping.

Open-Hole Petrophysical Logging

Upon reaching TD (Total Depth) of the exploratory boring, a suite of open-hole petrophysical logging surveys will be recorded to document subsurface lithologic characteristics versus depth. Petrophysical logging will also be used to help identify the depth to the top of the saturated zone, determine total alluvial thickness and depth to bedrock, as well as determine static fluid level in the borehole. PEC proposes to record the following suite of logging surveys:

- Single Point Resistivity
- Gamma Ray
- Spontaneous Potential

The PEC Hydrogeologist will be on site to supervise petrophysical logging operations and interpret the recorded data. Petrophysical logs will be used to aid in the development of final well design for the production well and high-grade the final placement of future wells.

Integrity of the petrophysical logging surveys will be validated by the PEC Hydrogeologist by employing the following general quality control methodology:

- Perform an examination the log heading, calibrations, repeat sections (if presented), scales, and remarks
- Identify any reported or suspected operational problems
- Verify measurement scales, and if necessary request that log scales be calibrated to conform to established formation data values
- Examine the shape and character of each recorded log curve to ensure the response is commensurate with the type of device generating the measurement

Sieve Analysis

At the direction of the PEC Hydrogeologist, subsurface formation samples collected from the exploratory boring will be selected for submittal to a geotechnical laboratory for sieve gradation analysis. The raw sieve gradation data will be used to develop gradation cross-plots to illustrate grain size distribution of the samples collected from the borehole. The sieve cross-plots will serve as the basis for designing production well gravel pack and screen slot opening size.

Groundwater Sampling

PEC recommends that a groundwater sample be collected at the end of test pumping operations and analyzed for the following dissolved-phase chemical parameters:

Total Dissolved Solids (TDS)	Total Iron (Fe)
Electrical Conductivity (EC)	Barium (Ba)
Hydrogen-Ion Activity (pH)	Fluoride (F)
Sodium (Na)	Nitrate (NO_3 as Nitrogen-N)
Potassium (K)	Silica (as SiO_2)
Calcium (Ca)	Bromide (Br)
Magnesium (Mg)	Arsenic (As)
Manganese (Mn)	Total Chromium (Cr)
Total Hardness (as $CaCO_3$)	Hexavalent Chromium (Cr VI)
Chloride (Cl)	Selenium (Se)
Bicarbonate Alkalinity (HCO_3)	Uranium (U)
Carbonate Alkalinity (CO_3)	Gross α radioactivity
Total Alkalinity (as $CaCO_3$)	Gross β radioactivity

Additional required chemical parameters are included in Appendix A. To ensure that only dissolved-phase analyte concentrations are reported, it is imperative that the laboratory filter all groundwater samples through at least a 0.5 micron filter prior to analysis. PEC recommends that all groundwater samples be submitted to a laboratory certified by the ODEQ to perform drinking water analyses.

Production Well

Based on review of OWRB well completion records, PEC anticipates completion of a 125-foot deep, 16.0-inch diameter (nominal) production well. PEC will submit the proposed well design and acquire the necessary permits associated with the production well from the Oklahoma Department of Environmental Quality (ODEQ) and OWRB. The PEC Hydrogeologist will supervise and direct drilling and completion operations.

Reverse Osmosis Pilot Study

Oversee the implementation of a reverse osmosis pilot study. The intent of the pilot study is to provide water treatment process efficiency data and full scale design parameters, specifically waste stream quantity and concentration.

Engineering Report

Prepare an Engineering Report in accordance with the requirements set forth in the Oklahoma Administrative Code (OAC), specifically 252:626 Public Water Supply Construction Standards, for review and approval by the Oklahoma Department of Environmental Quality (ODEQ). An approved Engineering Report is necessary prior to preparing construction plans and specifications.

The Engineering Report will include the following components, in accordance with the Oklahoma Funding Agency Coordinating Team Checklist for Engineering Reports for Water Projects:

- Project Planning Area
  - Location map showing boundaries of service area
  - Design period
  - Growth and population trends
  - Current and projected water use data
  - Environmental concerns in service area
- Existing Facilities and Need for Project
  - Location and layout
  - Condition of existing facilities
  - Health and safety
  - System O&M
  - Growth capacity
  - Sewage system availability
- Alternatives Considered
  - Description of facilities associated with each alternative
  - Design criteria used for evaluation purposes
  - Environmental impacts
  - Land requirements
  - Construction problems affecting cost or operation of facility
  - Cost estimates
  - Advantages/Disadvantages
- Proposed Project Design (Recommended Alternative)
  - Source of water supply
  - Water rights
  - Treatment
  - Storage
  - Pumping stations
  - Distribution layout
  - Hydraulic calculations
  - Waste disposal
  - Recommended alternative cost estimate
- Proposed Project's Financial Status and Cost Estimates
- Conclusions and Recommendations

B. Responsibility of CLIENT:

The CLIENT agrees to provide the following items pursuant to PEC accomplishing the Scope of Services outlined herein:

1. Secure contract and location for construction of a water supply well to be used for testing, piloting, and permanent service.
2. Enter into an agreement with a reverse osmosis equipment manufacturer to perform piloting
3. Perform or assign requested water chemistry analyses
4. Provide available data such as distribution system maps, water usage records, test well data, water quality data, construction plans, or other records pertinent to the water supply system.
5. Provide timely review and comments of interim information prepared by PEC for the CLIENT for review.
6. Provide other information requested by PEC to assist in the development of the final deliverables.

C. Exclusions:

The following items are specifically excluded from the Scope of Services provided by PEC:

1. Water chemistry testing analyses and associated fees
2. Reverse osmosis piloting fees
3. Preparation of construction plans and specifications
4. Surveying services
5. Geotechnical services
6. Design phase services
7. Bidding and construction phase services

D. Payment Provisions:

PEC proposes to perform the Scope of Services described above for a lump sum amount of $160,000.00.

Unless otherwise agreed upon, billings will be made monthly based on completion of the items listed above.

Taxes are not included in stated fees. CLIENT shall reimburse PEC for any sales, use and value-added taxes, which apply to these services.

E. Time of Performance:

PEC proposes to begin work on the PROJECT within ten (10) business days following receipt of an executed copy of this agreement and to complete the Scope of Services within 180 calendar days, exclusive of ODEQ review and approval

timeframes, as well as any delays beyond the control of PEC.

This letter and the Standard Conditions attached hereto comprise the entire agreement between the CLIENT and PEC. They may be altered only by written supplemental agreement agreed to by both parties. Furthermore, this agreement may be canceled by CLIENT, for any reason, by providing PEC with thirty (30) days prior written notice.

Thank you for contacting us to provide professional services on the subject PROJECT. Should you have questions or need additional information, please do not hesitate to call. Return receipt of an executed copy of this letter will serve as our contract and notice to proceed with the work.

Very truly yours,

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

Ethan J.L. Edwards, P.E.
Tulsa Division Manager/Principal

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

By: Ethan J L Edwards

Ethan J.L. Edwards, P.E.

Date: 6/25/13

City of Clinton, Oklahoma

By: _____

Title: _____

Date: _____

ATTEST:

By: _____

Attachment A
Analytical Requirements

METALS			
Aluminum	0.05 - 0.2	mg/l	SMCL
Antimony	0.006	mg/l	MCL
Arsenic	0.01	mg/l	MCL
Barium	2	mg/l	MCL
Beryllium	0.004	mg/l	MCL
Cadmium	0.005	mg/l	MCL
Calcium		mg/l	
Chromium, Total	0.1	mg/l	MCL
Chromium VI			
Cobalt			
Copper	1	mg/l	SMCL
Cyanide	0.2	mg/l	MCL
Iron	0.3	mg/l	SMCL
Germanenum			
Lead	0.015	mg/l	TT
Magnesium		mg/l	
Manganese	0.05	mg/l	SMCL
Mercury	0.002	mg/l	
Molybdenum			
Nickle		mg/l	MCL
Potassium		mg/l	
Selenium	0.05	mg/l	SMCL
Silver	0.1	mg/l	MCL
Sodium		mg/l	MCL
Strontium			
Thallium	0.002	mg/l	TT
Vandium			
Zinc	5	mg/l	SMCL
MINERAL ANALYSIS			
Chloride	250	mg/l	SMCL
Fluoride	2	mg/l	MCL
Nitrate (as N)	10	mg/l	MCL
Nitrite (as N)	1	mg/l	MCL
pH	6.5 - 8.5	units	SMCL
Sulfate	250	mg/l	SMCL
Specific Conductance		microS/sm	
Total Alkalinty		mg/l as Ca CO3	
Total Dissolved Solids	500	mg/l	SMCL
Total Hardness		mg/l as Ca CO3	
Total Phosphate		mg/l as P	

Attachment A
Analytical Requirements

Turbidity		NTU	
RADIOLOGICAL CONTAMINANTS			
Combined Radium 226 and 228	5	pCi/L	MCL
Gross Alpha Partical (excluding uranium) Activity	15	pCi/L	MCL
Uranium	30	ug/L	MCL

Analysis for uranium required if gross alpha is greater than 15pCi/L
Analysis for Radium 226 and 228 required for all samples
Disposal of all samples shall be the responsibility of the contractor

Method 524.2 - Volatile Organics			
Benzene	0.005	mg/l	MCL
Vinyl Chloride	0.002	mg/l	MCL
Carbon Tetrachloride	0.005	mg/l	MCL
1,2-Dichloroethane	0.005	mg/l	MCL
Trichloroethane	0.005	mg/l	MCL
P-Dichlorobenzene	0.075	mg/l	MCL
1,1-Dichloroethylene	0.007	mg/l	MCL
1,1,1-Trichloroethane	0.2	mg/l	MCL
O-Dichlorobenzene	0.6	mg/l	MCL
Cis-1,2-Dichloroethylene	0.07	mg/l	MCL
Trans-1,2-Dichloroethylene	0.1	mg/l	MCL
1,2-Dichloropropane	0.005	mg/l	MCL
Ethybenzene	0.7	mg/l	MCL
Monochlorobenzene	0.1	mg/l	MCL
Styrene	0.1	mg/l	MCL
Tetrachloroethylene	0.005	mg/l	MCL
Toluene	1	mg/l	MCL
Xylene	10	mg/l	MCL
Dichloromethane	0.005	mg/l	MCL
1,1,2-Trichlorethane	0.005	mg/l	MCL
1,2,4-Trichlorobenzene	0.07	mg/l	MCL
Acid (PFOS)			
Methyl Tertiary Butyl Ether (MTBE)			
Chloroform (THM)			
Bromodichloromethane (THM)			
Bromoform (THM)			
Chlorodibromomethan (THM)			
Chlorobenzene			
Dioxnep-			
M-Dichlorobenzene			

Dibromomethan				
1,1-Dichloropropene				
1,1-Dichloroethane				
1,1,2,2-Tetrachloroethane				
1,3-Dichlorpropane				
Chloromethane				
Bromomethane				
1,2,3-Trichloropropane				
1,1,1,2-Tetrachloroethane				
Chloroethane				
2,2-Dichloropropane				
O-Chlorotoluene				
P-Chlorotoluene				
Bromobenzene				
1,3-Dichloropropene				
Perfuoroultane Sulfonic				
Method 507/508 - Chlorinated Pesticides				
Alachlor		0.002	mg/l	MCL
Altrazine		0.003	mg/l	MCL
Chlordane		0.002	mg/l	MCL
Endrin		0.002	mg/l	MCL
Heptachlor		0.0004	mg/l	MCL
Heptachlor-Epoxide		0.0002	mg/l	MCL
Lindane		0.0002	mg/l	MCL
Methoxychor				
PCBs		0.04	mg/l	MCL
	1016	0.0005	mg/l	MCL
	1221			
	1232			
	1242			
	1248			
	1254			
	1260			
Simazine		0.004	mg/l	MCL
Toxaphene		0.003	mg/l	MCL
Hexachlorobenzene		0.001	mg/l	MCL
Hexachlorocyclopentadiene		0.05	mg/l	MCL
Aldrin				
Butachlor				
Dieldrin				
Metrolachor				

Metribuzin			
Propachlor			
METHOD 515.1 - Chlorinated Acid Pesticides			
2,4-D	0.07	mg/l	MCL
2,4,5-TP	0.05	mg/l	MCL
Pentachlorophenol	0.001	mg/l	MCL
Dinoseb	0.007	mg/l	MCL
Picloram	0.5	mg/l	MCL
Dicamba			
METHOD 525.2 - PAH's, Phthlates, Adipates			
Benzo(a)pyrene	0.0002	mg/l	MCL
Di 2-Ethylhexyl Adipate	0.4	mg/l	MCL
Di 2-Ethylhelyl Phthalate	0.006	mg/l	MCL

Based from"Drinking Water Standards and Health Advisories" Winter 2011.